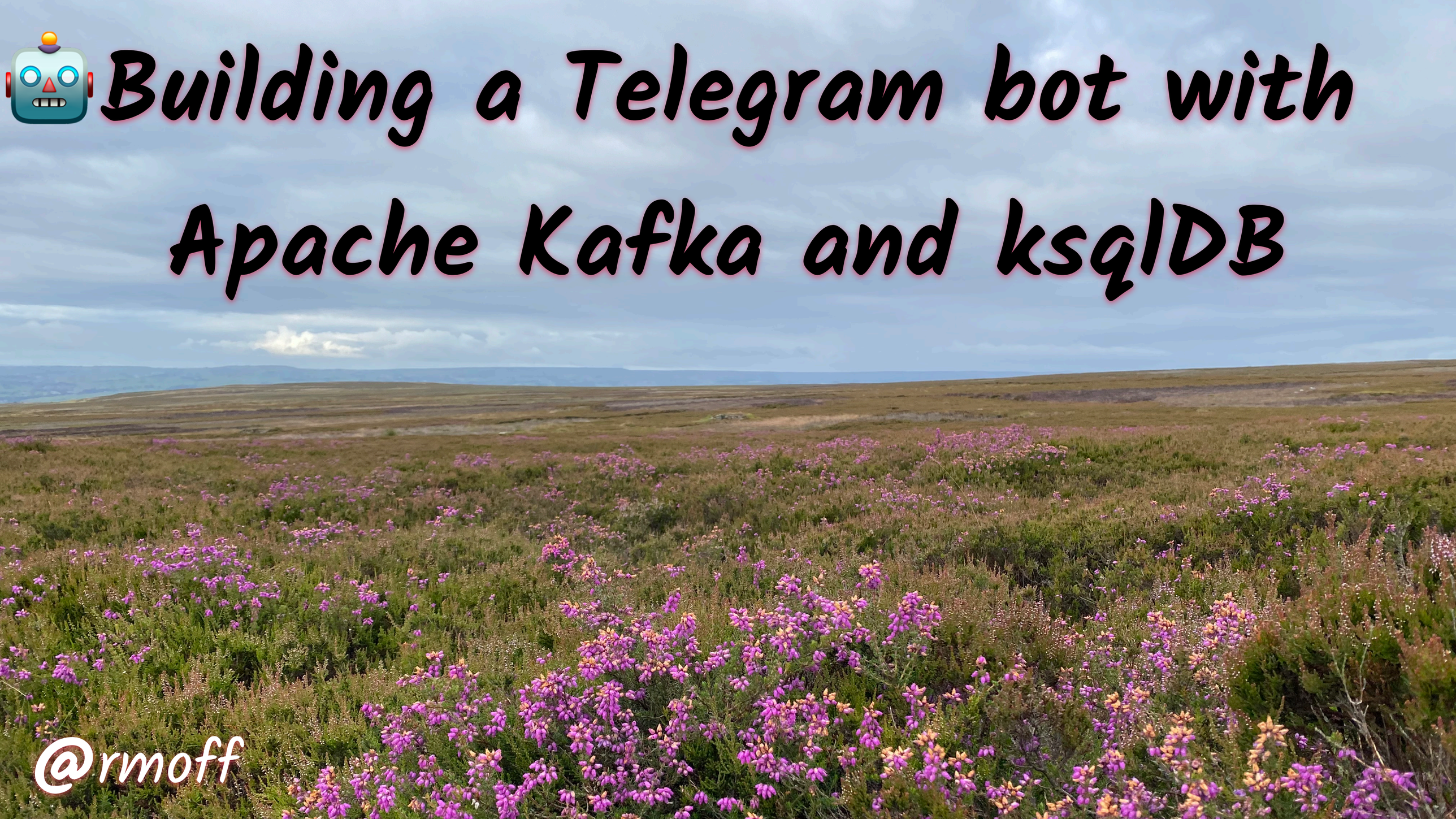

🤖Building a Telegram bot with Apache Kafka and ksqlDB
@rmoff

N C P Welcome to Hall Ings Car Park
BRADFORD CAPITAL OF CYCLING

How many spaces are available in this car park?
N C P Welcome to Hall Ings Car Park
£3.50
BRADFORD CAPITAL OF CYCLING

Where's my nearest carpark
with available spaces?
N C P Welcome to Hall Ings Car Park
BRADFORD CAPITAL OF CYCLING

💡Tell me when a car park with spaces is available
N C P Welcome to Hall Ings Car Park
BRADFORD CAPITAL OF CYCLING

How does occupancy vary over time?
N C P Welcome to Hall Ings Car Park
£3.50
BRADFORD CAPITAL OF CYCLING

$ whoami

> Robin Moffatt (@rmoff)

> Senior Developer Advocate at Confluent

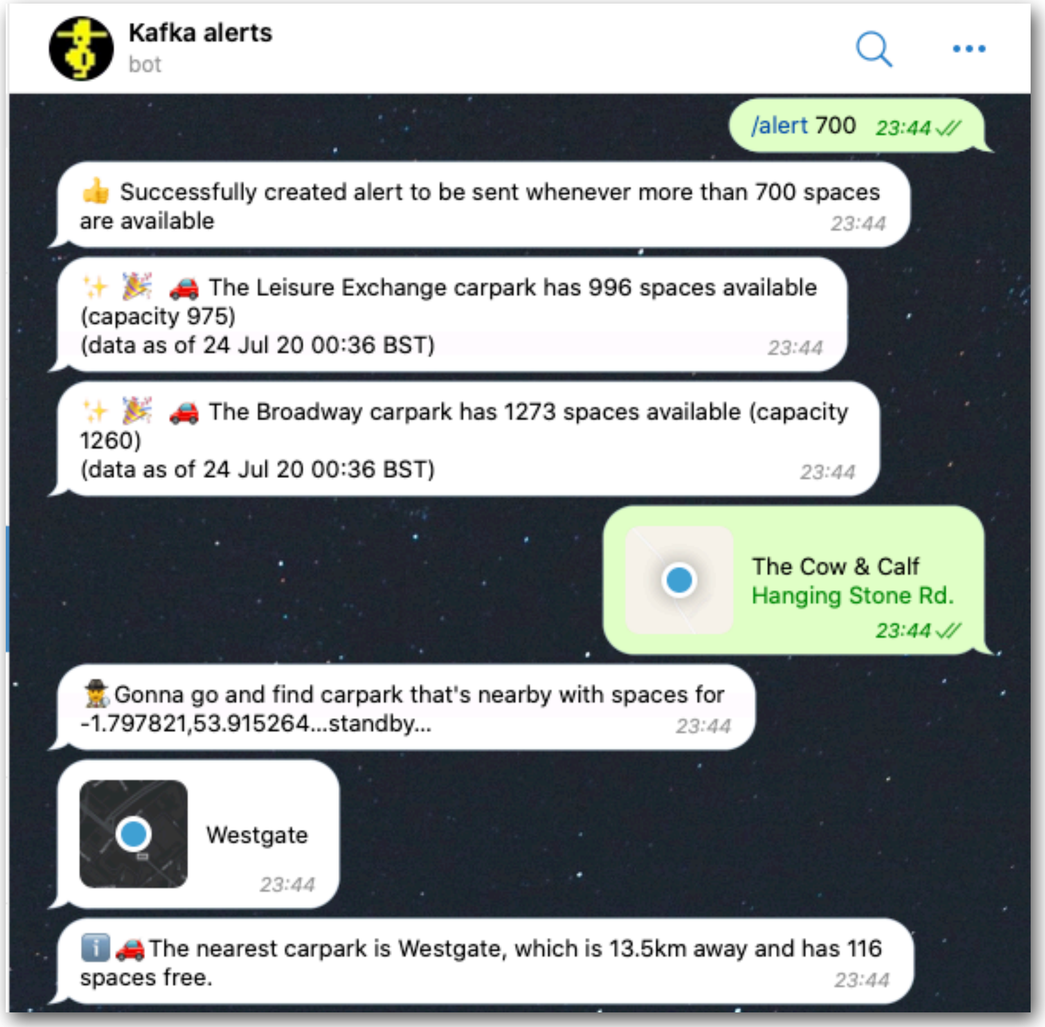
(Apache Kafka, not Wikis 😉)

> Working in data & analytics since 2001

> Oracle ACE Director (Alumnus)

http://rmoff.dev/**talks** • http://rmoff.dev/**blog** • http://rmoff.dev/**youtube**

Telegram


Kafka alerts
bot
/alert 700 23:44
Successfully created alert to be sent whenever more than 700 spaces are available 23:44
The Leisure Exchange carpark has 996 spaces available (capacity 975)
(data as of 24 Jul 20 00:36 BST) 23:44
The Broadway carpark has 1273 spaces available (capacity 1260)
(data as of 24 Jul 20 00:36 BST) 23:44
The Cow & Calf
Hanging Stone Rd.
23:44
Gonna go and find carpark that's nearby with spaces for -1.797821,53.915264...standby... 23:44
Westgate
23:44
The nearest carpark is Westgate, which is 13.5km away and has 116 spaces free. 23:44

Telegram Bot

Telegram APIs

We offer two kinds of APIs for developers. The **Bot API** allows you to easily create programs that use Telegram messages for an interface. The **Telegram API and TDLib** allow you to build your own customized Telegram clients. You are welcome to use both APIs free of charge.

You can also add **Telegram Widgets** to your website.

Designers are welcome to create **Animated Stickers** or **Custom Themes** for Telegram.

Bot API

This API allows you to connect bots to our system. **Telegram Bots** are special accounts that do not require an additional phone number to set up. These accounts serve as an interface for code running somewhere on your server.

To use this, you don't need to know anything about how our MTProto encryption protocol works — our intermediary server will handle all encryption and communication with the Telegram API for you. You communicate with this server via a simple HTTPS-interface that offers a simplified version of the Telegram API.

> **Learn more about the Bot API here »**

Bot developers can also make use of our **Payments API** to accept **payments** from Telegram users around the world.

TDLib – build your own Telegram

Even if you're looking for maximum customization, you don't have to create your app from scratch. Try our **Telegram Database Library** (or simply TDLib), a tool for third-party developers that makes it easy to build fast, secure and feature-rich Telegram apps.

TDLib takes care of all **network implementation** details, **encryption** and **local data storage**, so that you can dedicate more time to design, responsive interfaces and beautiful animations.

TDLib supports all Telegram features and makes developing Telegram apps a breeze on any platform. It can be used on Android, iOS, Windows, macOS, Linux and virtually any other system. The library is open source and compatible with virtually **any programming language**.

> **Learn more about TDLib here »**

Telegram API

This API allows you to build your own customized Telegram clients. It is 100% open for all developers who wish to create Telegram applications on our platform. Feel free to study the open source code of existing Telegram applications for examples of how things work here. Don't forget to register your application in our system.

- Getting Started
- Security
- Optimization
- API methods

```go
// Subscribe to updates
u := tgbotapi.NewUpdate(0)
u.Timeout = 60
updates, err := bot.GetUpdatesChan(u)

// Process any messages that we're sent as they arrive
for update := range updates {
    if update.Message == nil { // ignore any non-Message Updates
        continue
    }

    chatID = update.Message.Chat.ID
    t := update.Message.Text
    log.Printf("[%s] %s (command: %v)", update.Message.From.UserName, t
    switch {
    case update.Message.IsCommand():
        // Handle commands
        switch update.Message.Command() {
        case "alert":
            threshold := update.Message.CommandArguments()
            if th, e := strconv.Atoi(threshold); e == nil {
                // Use a Go Routine to invoke the population
                // of the alert channel and handling the returned
                // alerts
                go func() {
                    ac := make(chan string)
                    go alertSpaces(ac, th)
                    msg := tgbotapi.NewMessage(chatID, fmt.Sprintf("👍
                    if _, e := bot.Send(msg); e != nil {
                        fmt.Printf("Error sending message to telegram.
                    }
```

Don't just tell me...

show me!

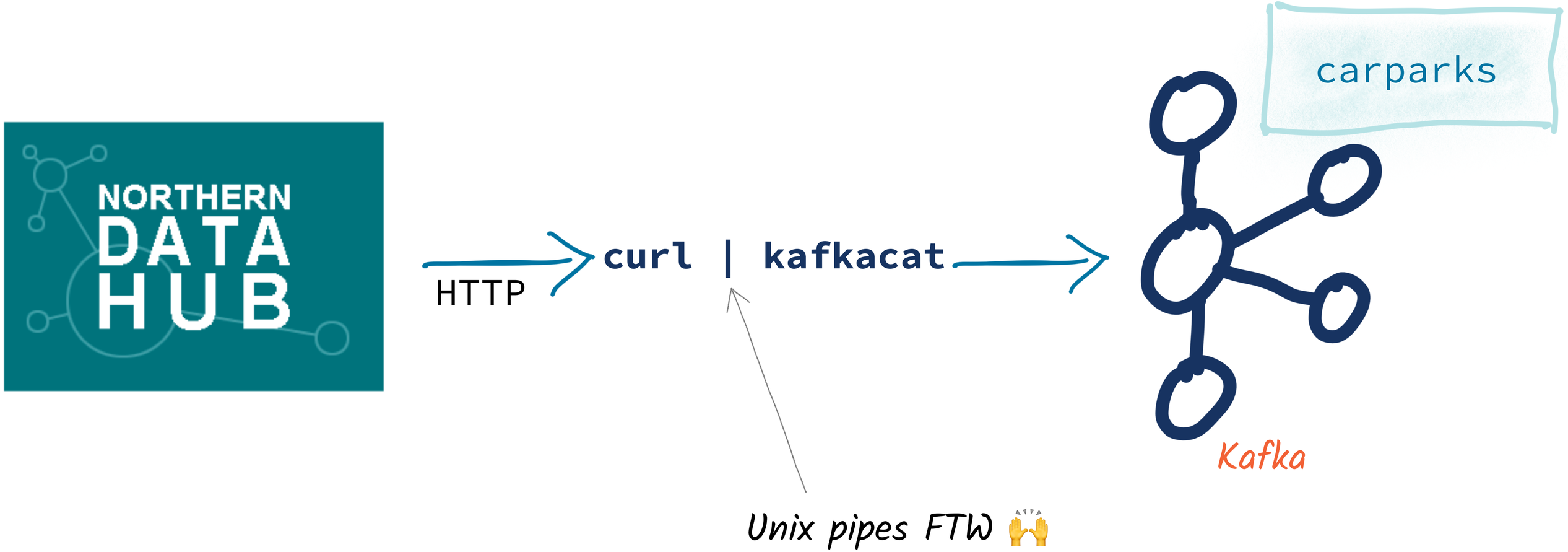
Demo code: https://rmoff.dev/carparks

API all the things!

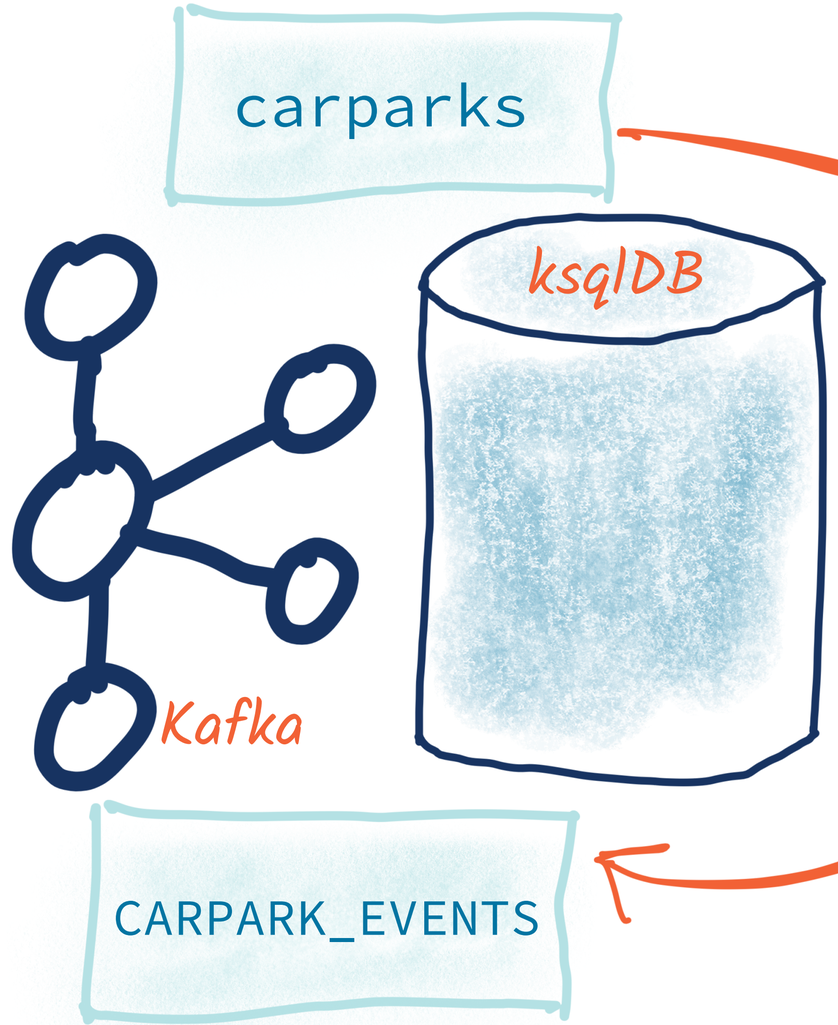
```
→ http https://datahub.bradford.gov.uk/ebase/api/getData/v2/Council/CarParkCurrent
HTTP/1.1 200 OK
Access-Control-Allow-Origin: *
Access-Control-Allow-Origin: *
Cache-Control: private
Content-Disposition: attachment; filename="carParkCurrent.csv"
Content-Encoding: gzip
Content-Length: 381
Content-Type: "text/csv"
Date: Tue, 28 Jul 2020 10:59:52 GMT
Server: Microsoft-IIS/8.5
Set-Cookie: JSESSIONID=5433FDC610177C14204184E7218C8370; Path=/ebase/; Secure; HttpOnly
ntCoent-Length: 1021

date,time,name,capacity,empty_places,status,latitude,longitude,directionsURL
2020-07-28,11:52,Westgate,116,74,Spaces,53.796291,-1.759143,"https://maps.google.com/?daddr=53.796291,-1.759143"
2020-07-28,11:52,Burnett St,122,110,Spaces,53.795739,-1.744756,"https://maps.google.com/?daddr=53.795739,-1.…"
2020-07-28,11:52,Crown Court,142,90,Spaces,53.792179,-1.748466,"https://maps.google.com/?daddr=53.792179,-…"
2020-07-28,11:52,Leisure Exchange,996,944,Spaces,53.79222,-1.746683,"https://maps.google.com/?daddr=53.79222,-…"
2020-07-28,11:52,NCP Hall Ings,526,490,Spaces,53.791838,-1.752201,"https://maps.google.com/?daddr=53.791838,-…"
```

Streaming Data Ingest

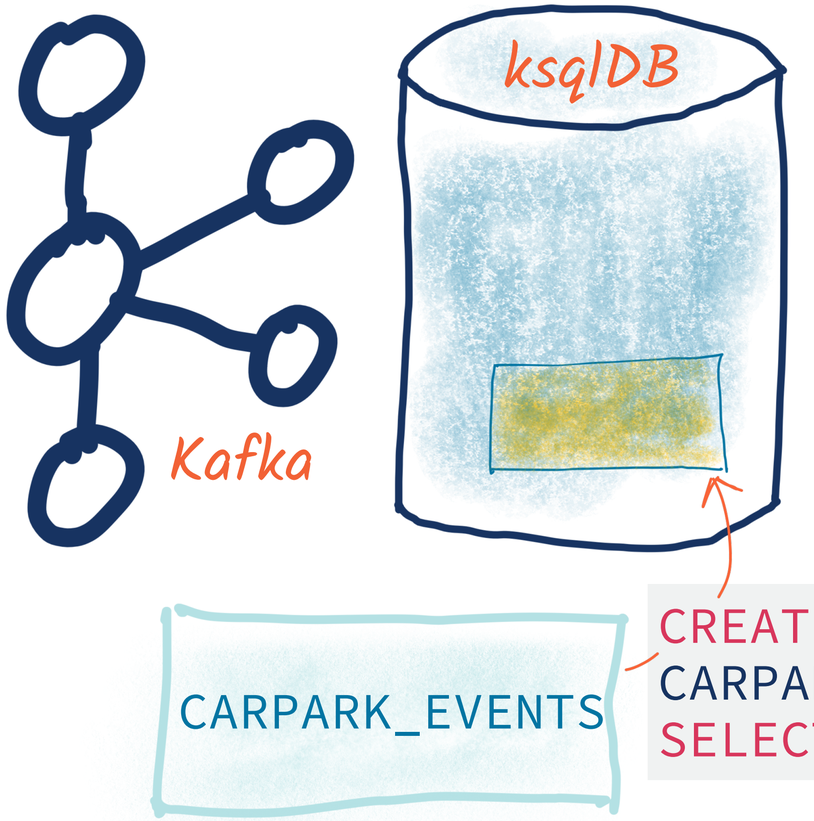


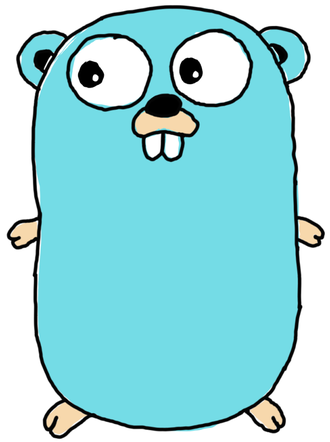
Streaming Data Transformation



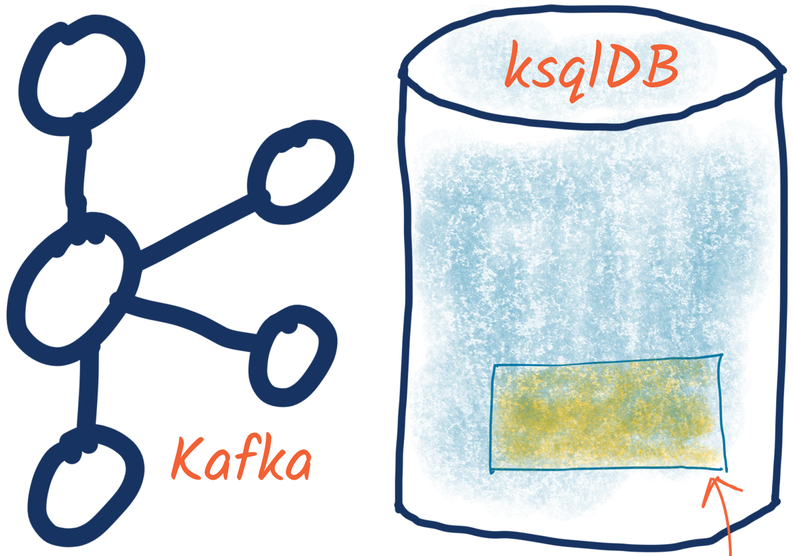

```
CREATE STREAM CARPARK_EVENTS
WITH (VALUE_FORMAT='PROTOBUF') AS
SELECT *,
       STRUCT("lat" := LATITUDE,
              "lon":= LONGITUDE),
       'v2/CarParkCurrent' AS SRC
  FROM CARPARK_SRC
  EMIT CHANGES;
```

KN Lookups (materialised views)



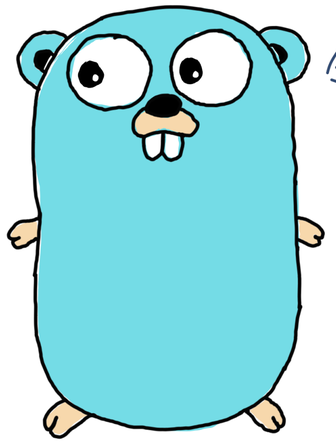


KN Lookups (materialised views)

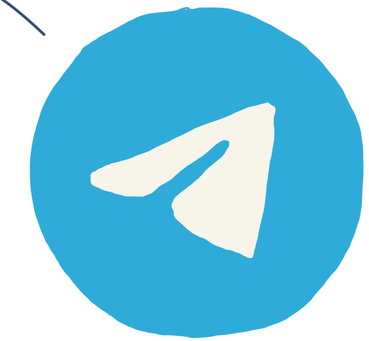


CARPARK_EVENTS

```
CREATE TABLE
CARPARK AS
SELECT …
```



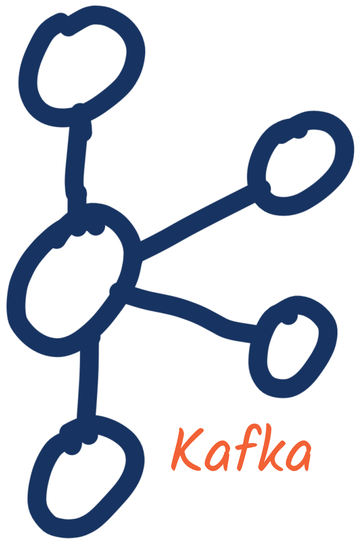
"How many spaces are free at Westgate carpark right now?"

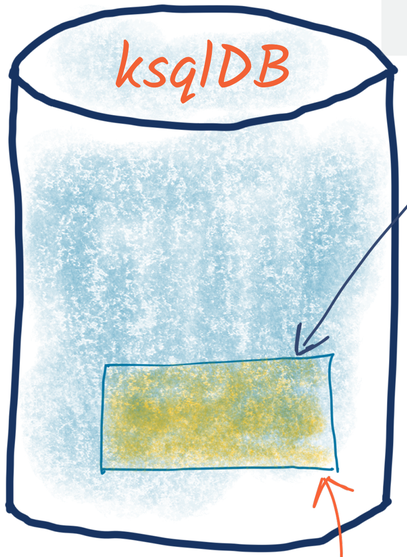


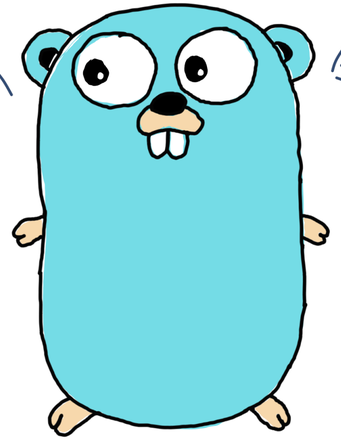
KN Lookups (materialised views)

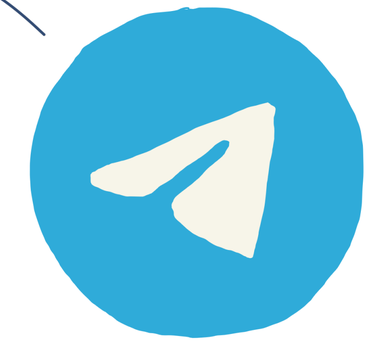
```
SELECT SPACES_AVAILABLE
  FROM CARPARK
 WHERE NAME='WESTGATE';
```

"How many spaces are free at Westgate carpark right now?"





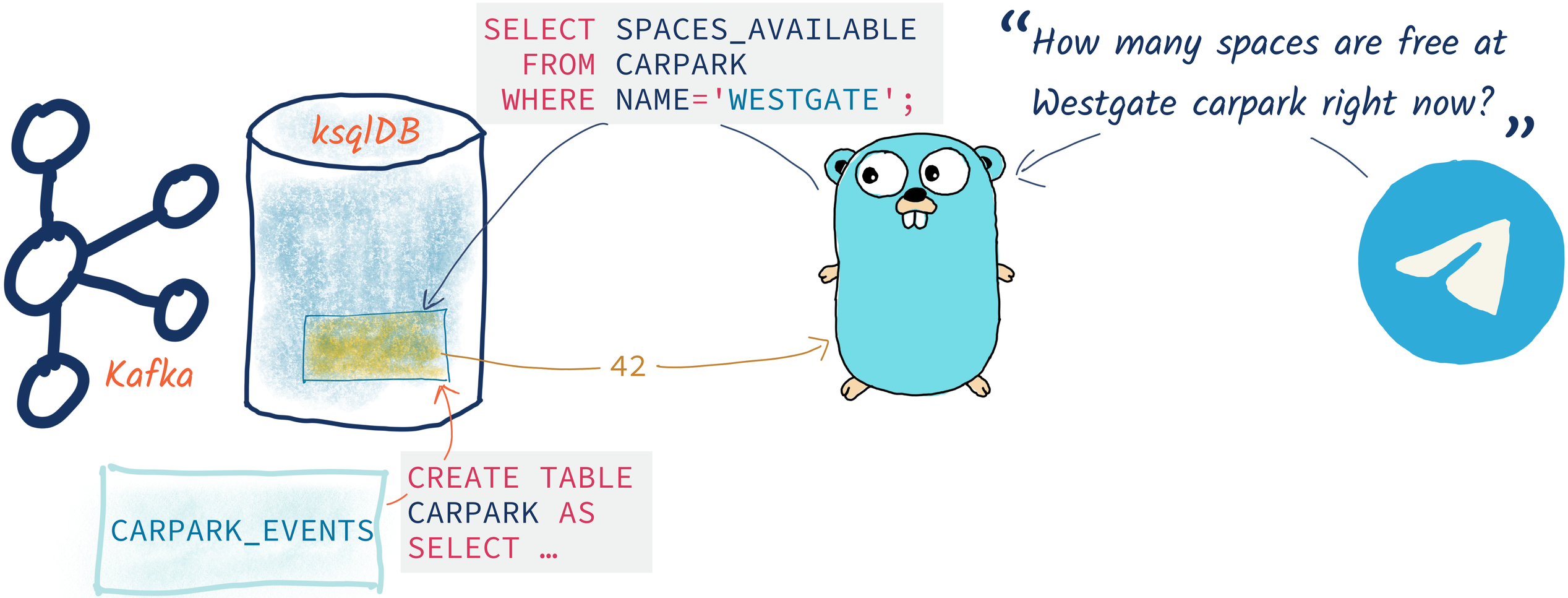




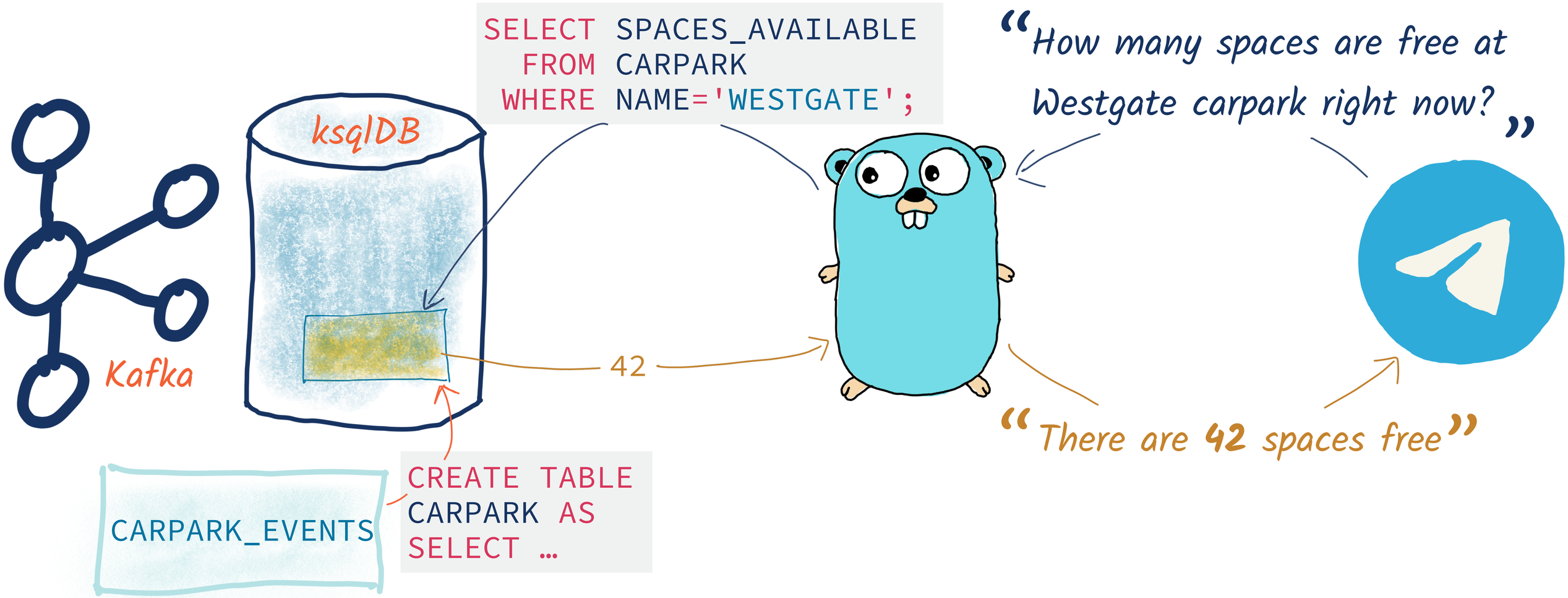
CARPARK_EVENTS

```
CREATE TABLE
CARPARK AS
SELECT …
```

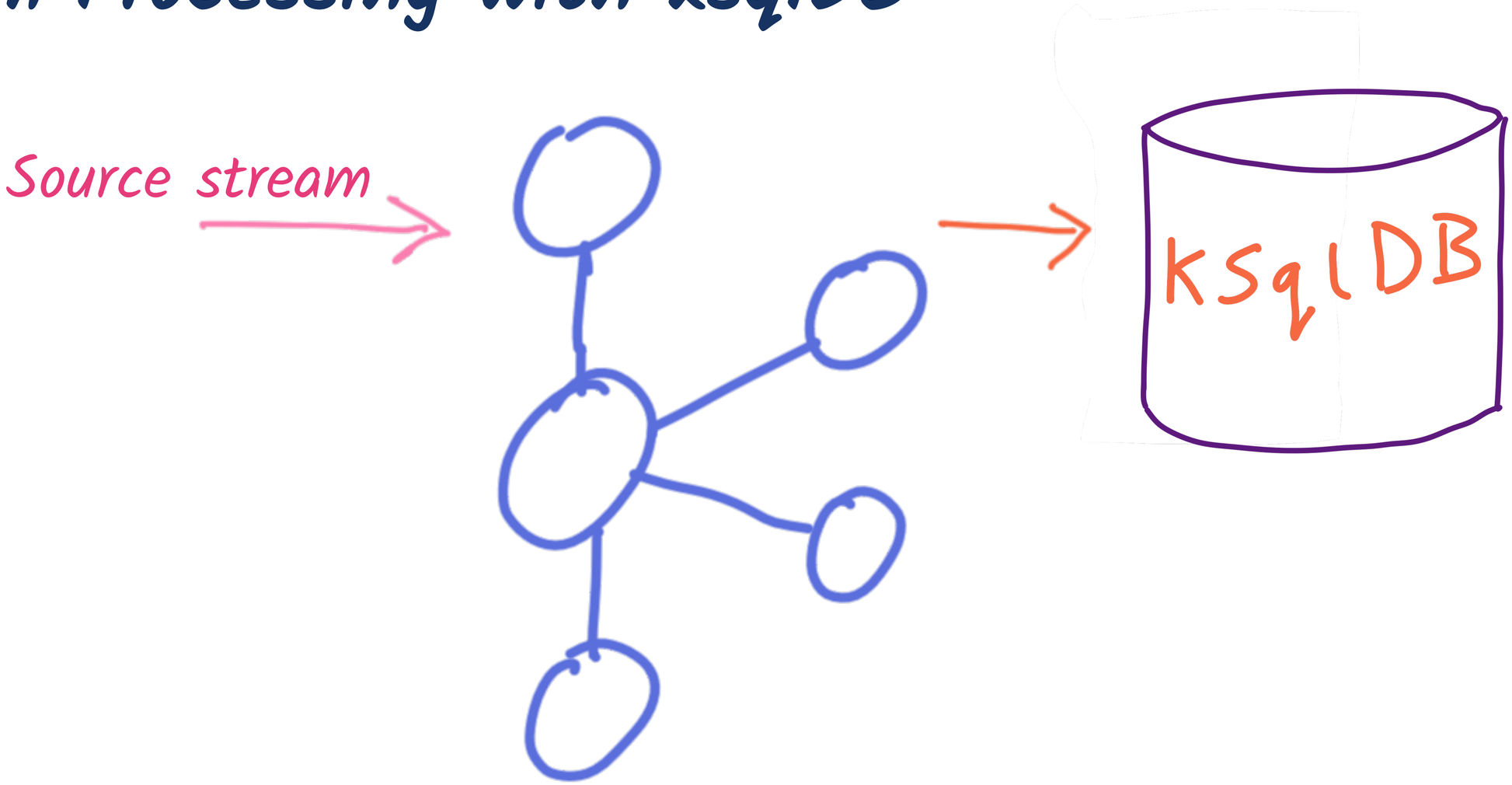
KN Lookups (materialised views)



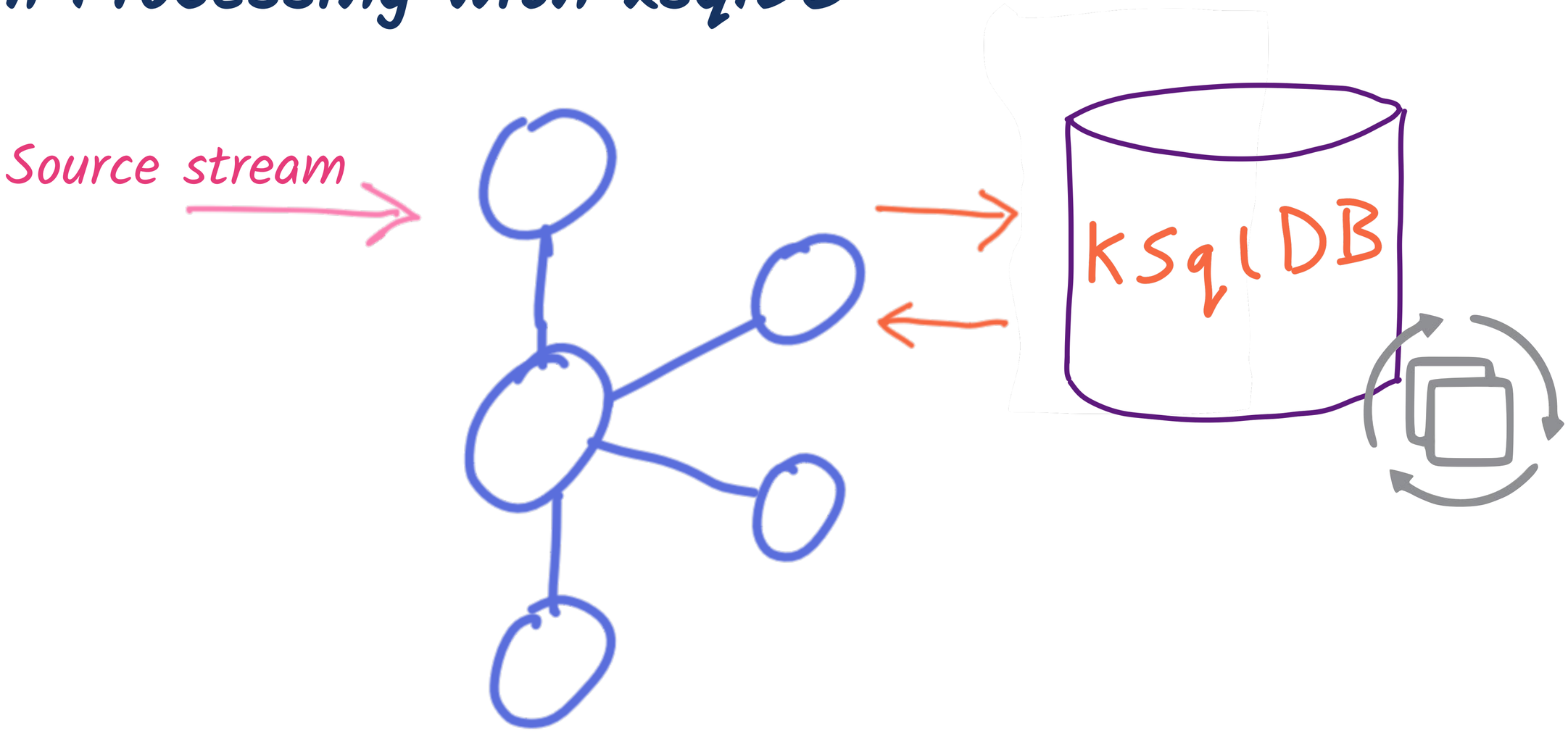
KN Lookups (materialised views)



Stream Processing with ksqlDB



Stream Processing with ksqlDB



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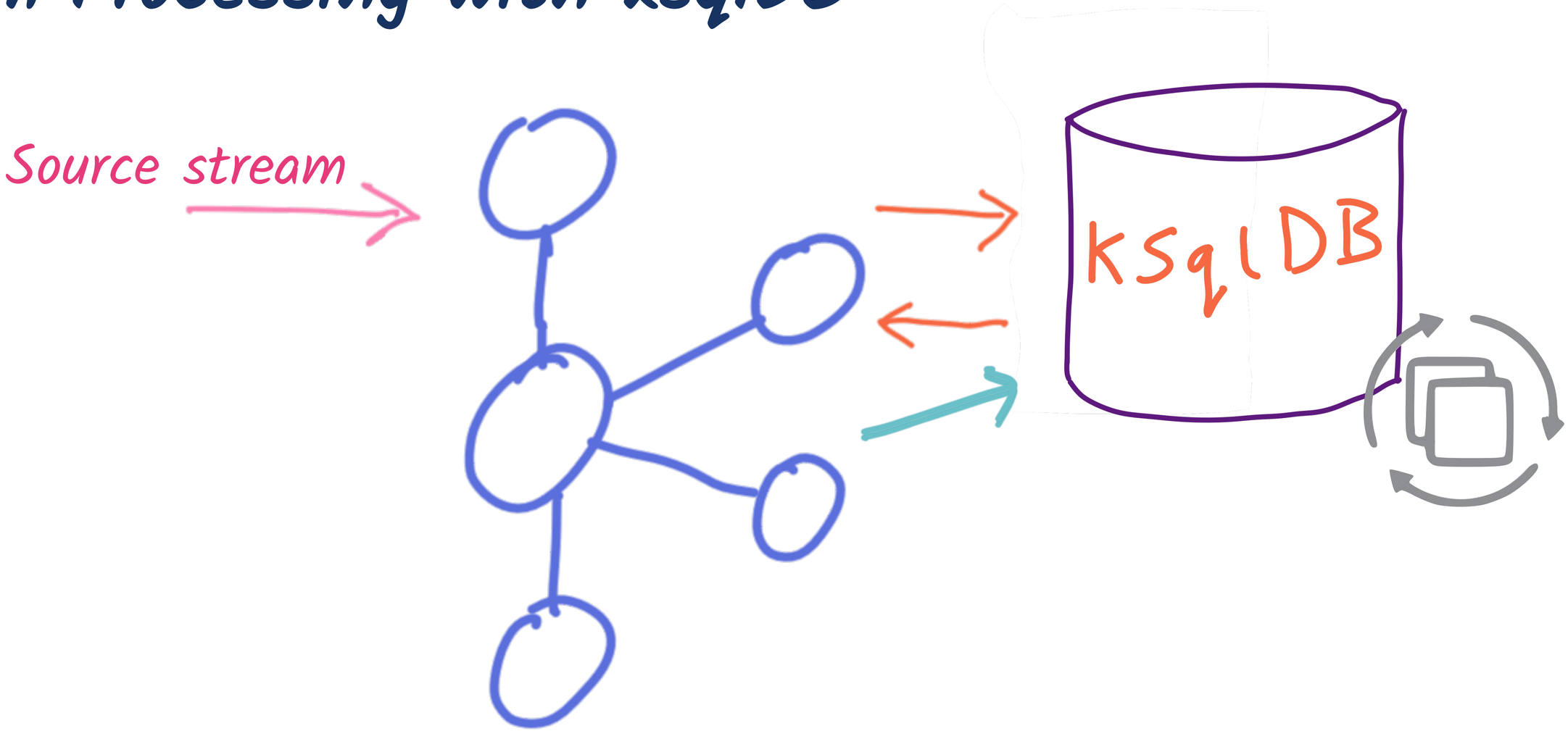
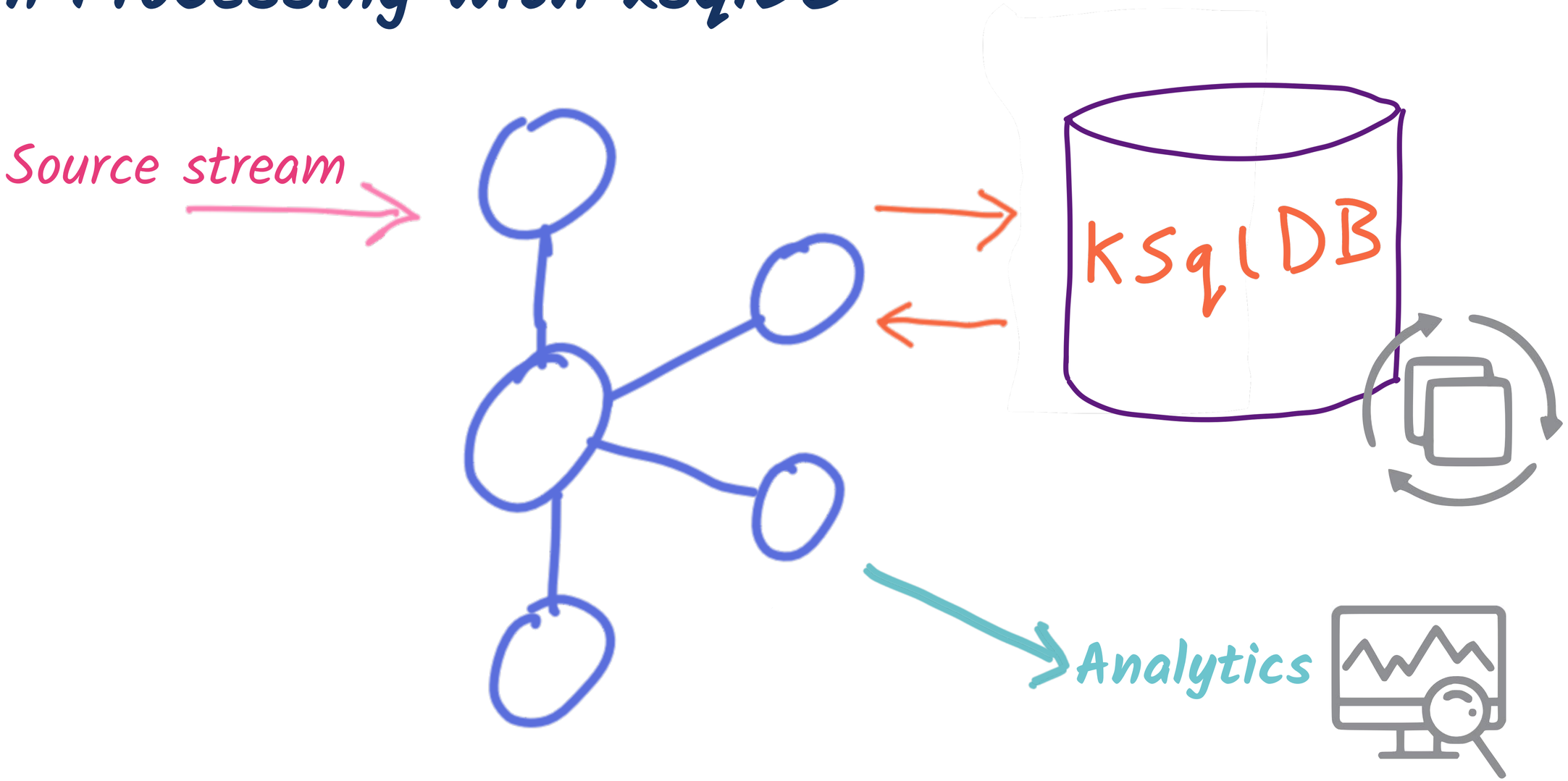
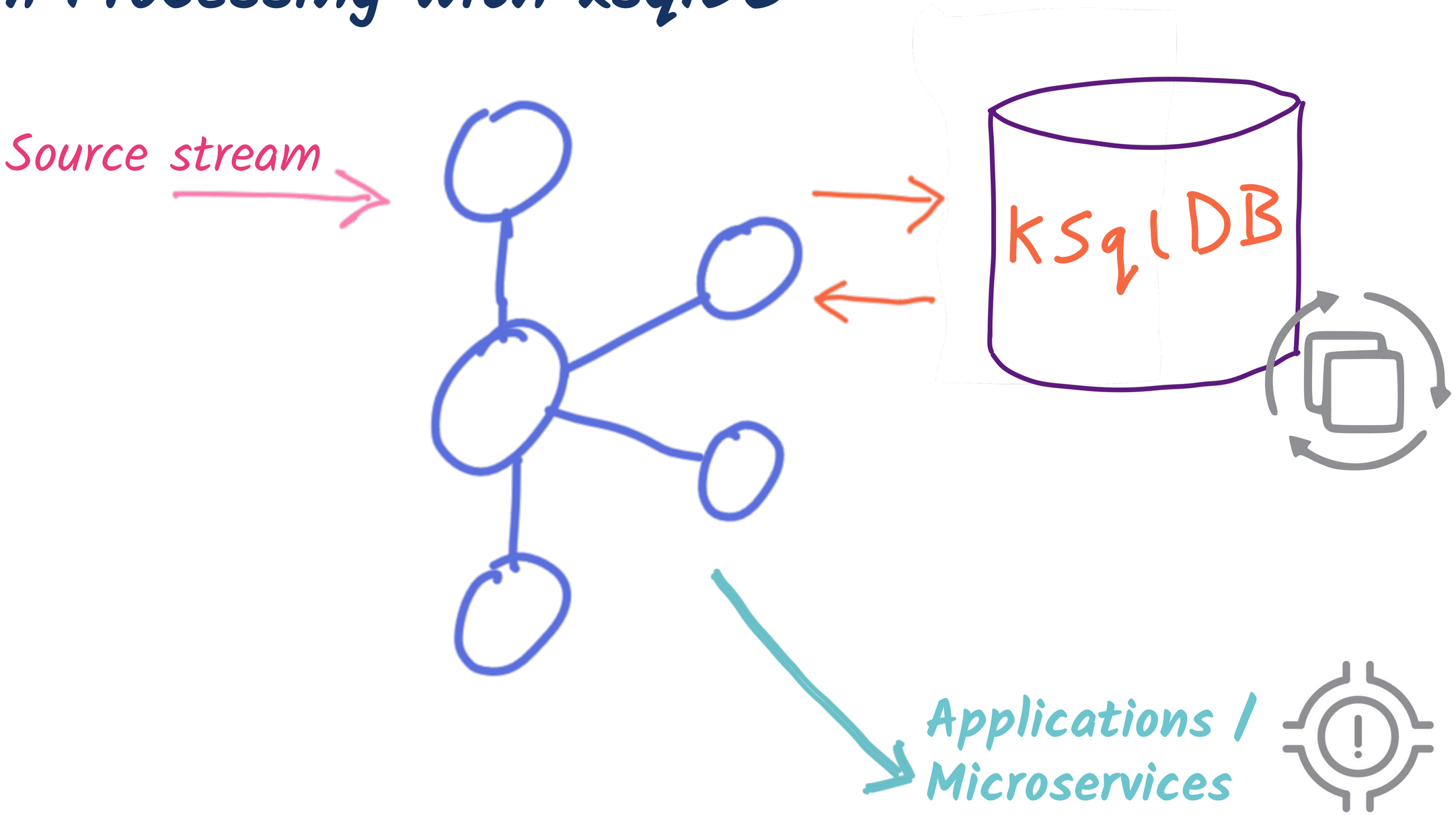


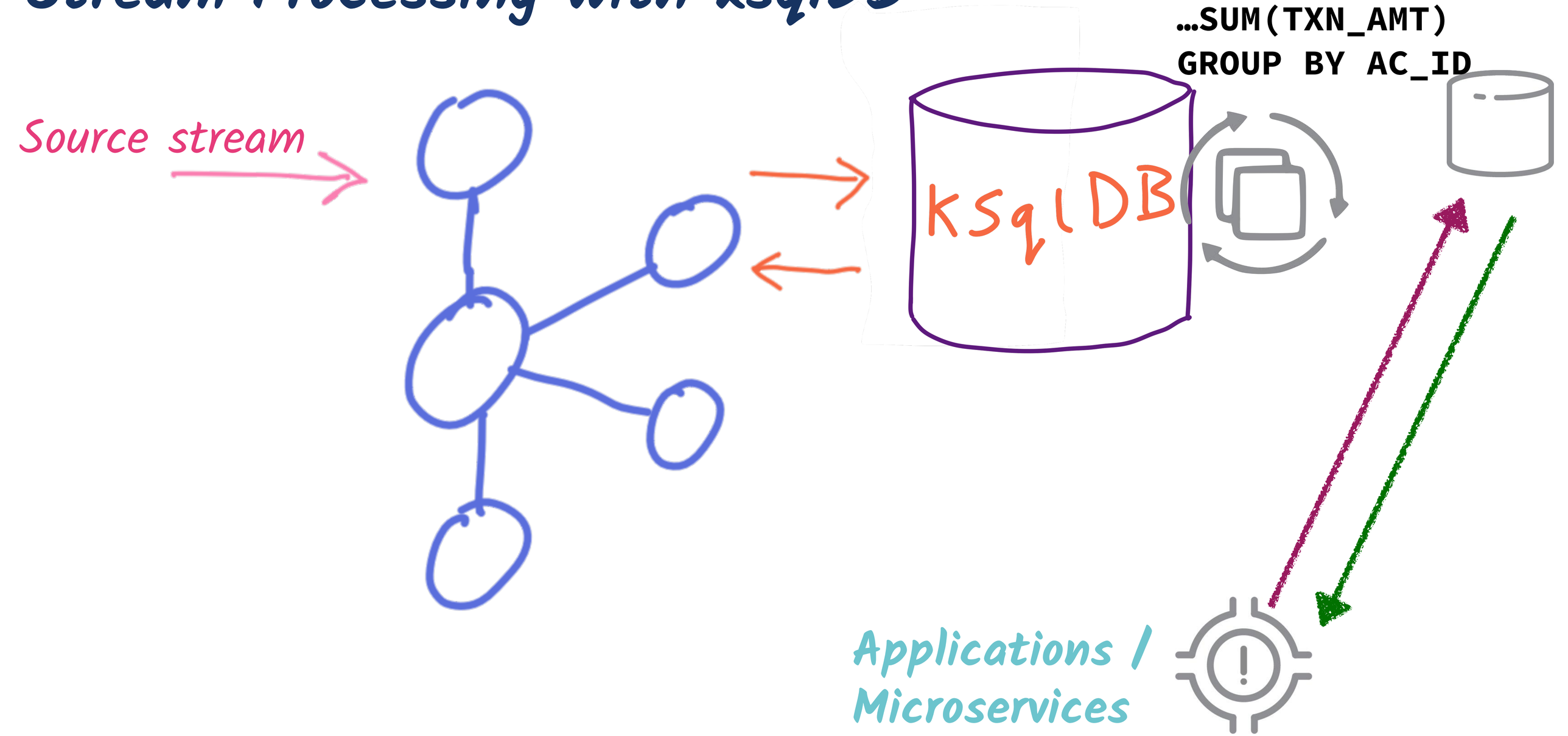
Stream Processing with ksqlDB



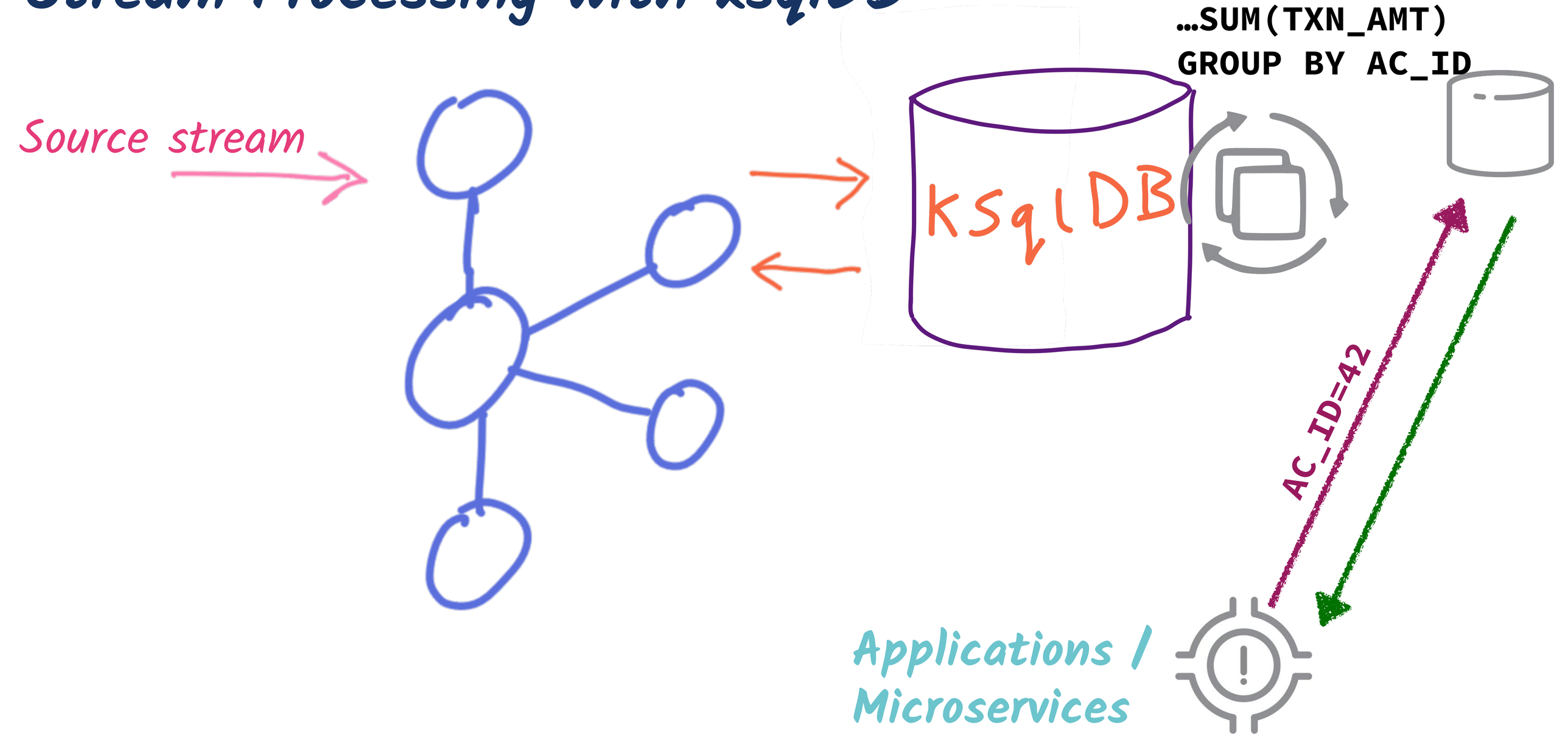
Stream Processing with ksqlDB



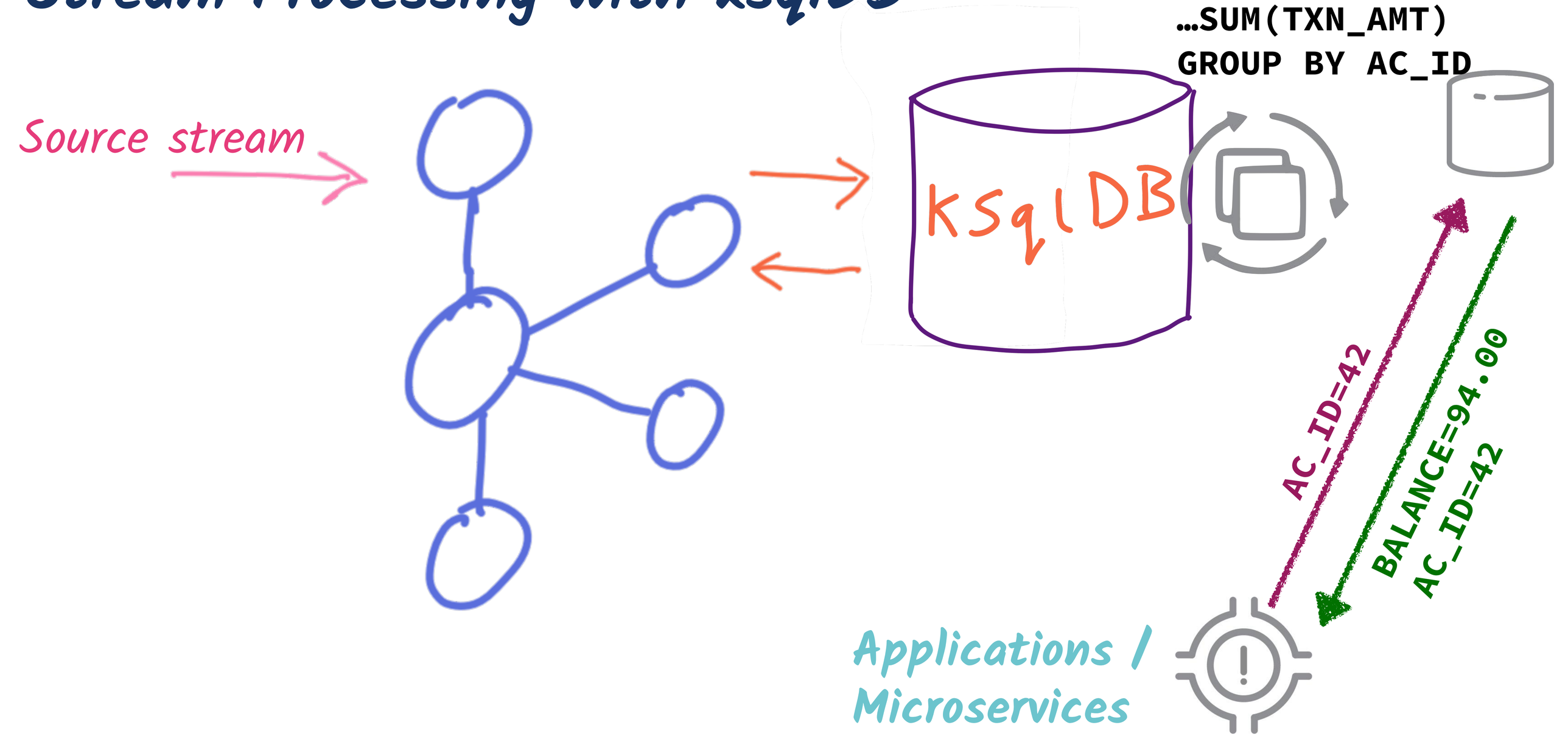
Stream Processing with ksqlDB



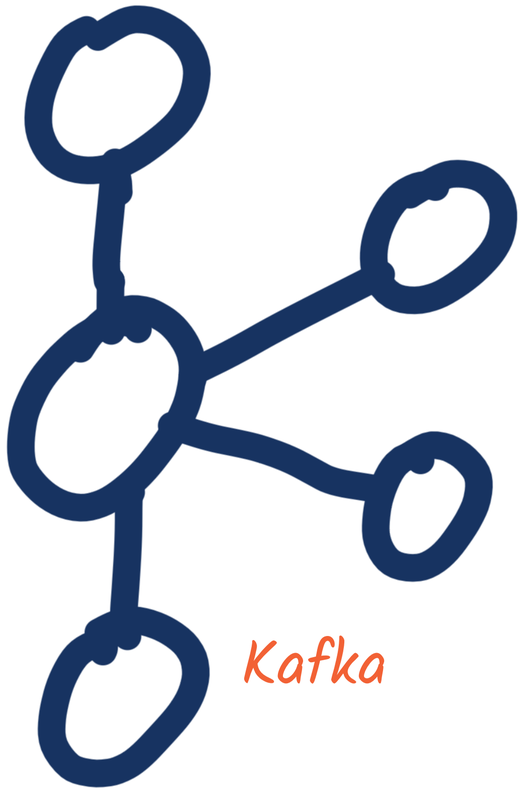
Stream Processing with ksqlDB



Stream Processing with ksqlDB



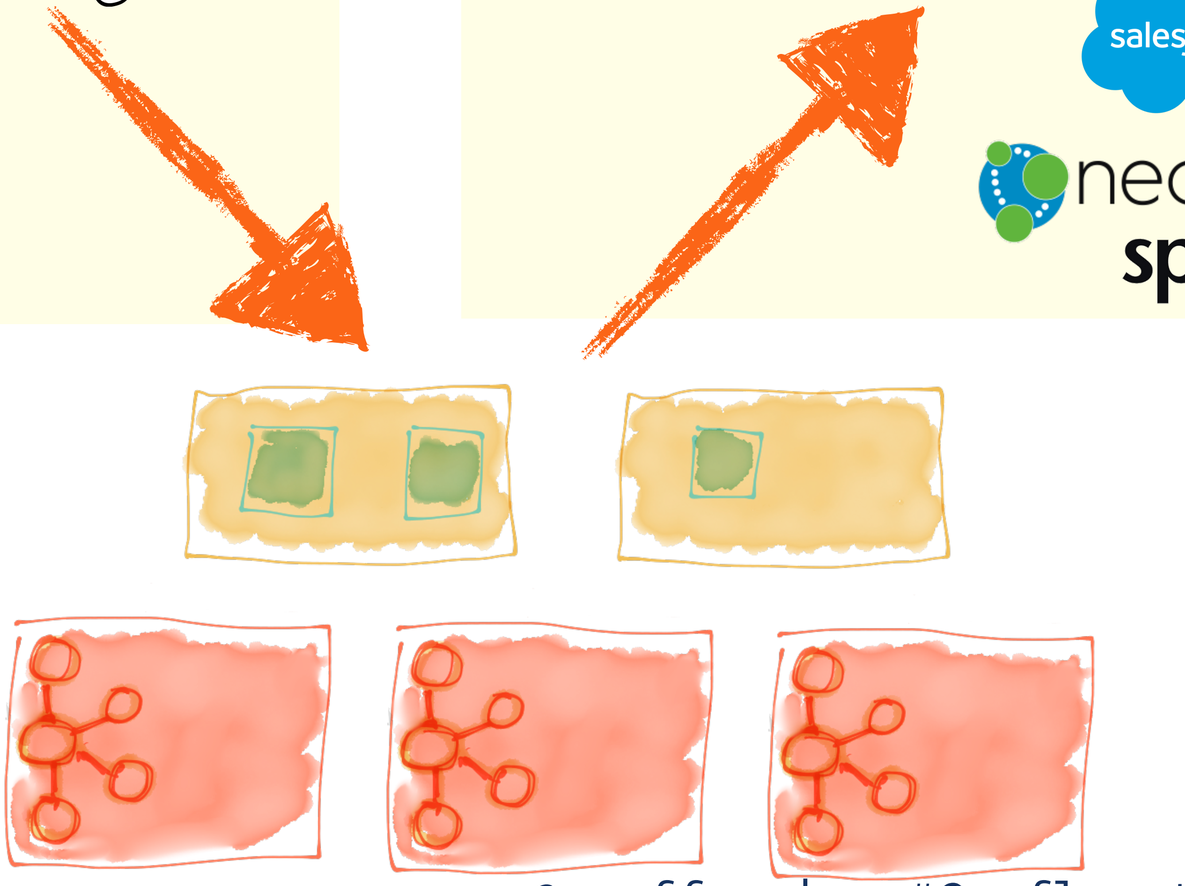
Streaming Analytics



Kafka

Kafka
Connect

Streaming Integration with Kafka Connect



Kafka Connect

Kafka Brokers

Streaming Analytics

Bradford Car Park data

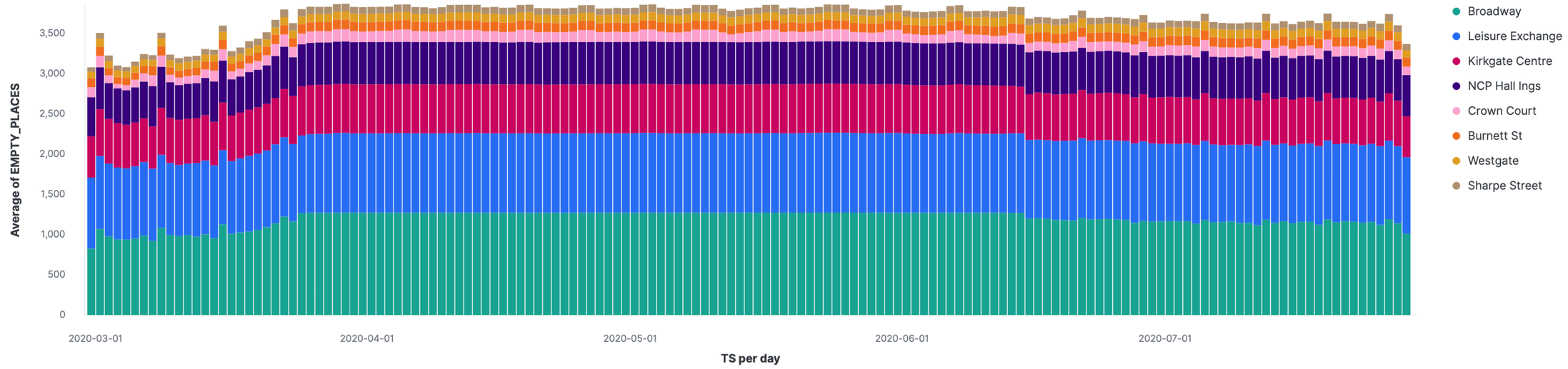
Data courtesy of Northern Data Hub

Current state

104	82	520	966
Westgate - Empty places	Sharpe Street - Empty places	NCP Hall Ings - Empty places	Leisure Exchange - Empty places

547	113
Kirkgate Centre - Empty places	Other - Empty places

Average empty places



Want to learn more?

CONFLUENT

CTAs, not CATs
(sorry, not sorry)

60DEVADV

Free money!
(additional $60 towards your bill 😄)

$50 USD off your bill each calendar month for the first three months when you sign up

https://rmoff.dev/ccloud

confluent cloud

Fully Managed Kafka as a Service

* Limited availability. Activate by 11th September 2020. Expires after 90 days of activation. Any unused promo value on the expiration date will be forfeited.

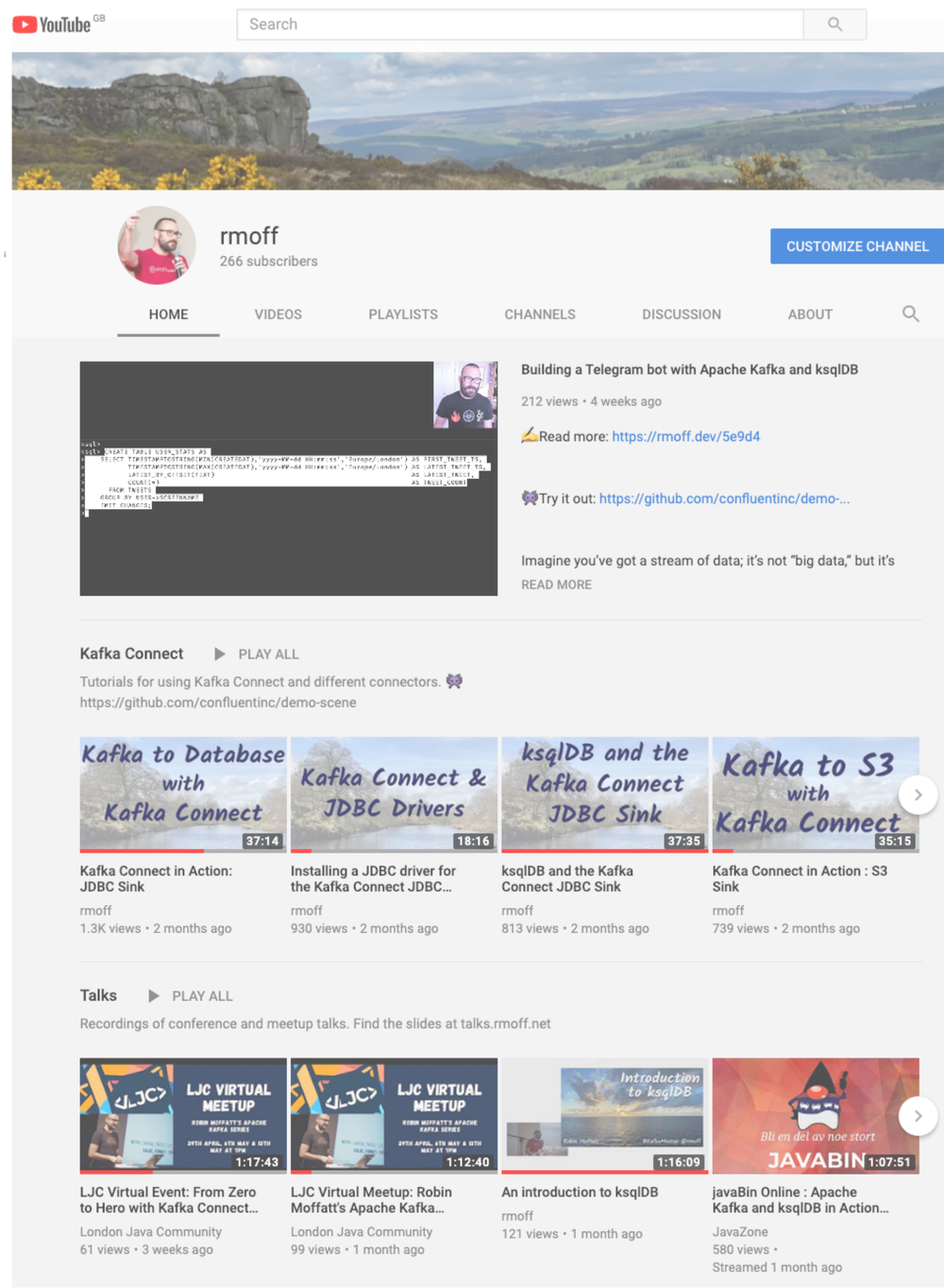
Learn Kafka.
Start building with Apache Kafka at Confluent Developer.
developer.confluent.io

Confluent Community Slack group

cnfl.io/slack

Further reading / watching

- **Kafka as a Platform: the Ecosystem from the Ground Up**
  - https://rmoff.dev/kafka101
- **Apache Kafka and ksqlDB in Action: Let's Build a Streaming Data Pipeline!**
  - https://rmoff.dev/ljc-kafka-01
- **From Zero to Hero with Kafka Connect**
  - https://rmoff.dev/ljc-kafka-02
- **Introduction to ksqlDB**
  - https://rmoff.dev/ljc-kafka-03
- **Integrating Oracle and Kafka**
  - https://rmoff.dev/oracle-and-kafka
- **The Changing Face of ETL: Event-Driven Architectures for Data Engineers**
  - https://rmoff.dev/oredev19-changing-face-of-etl
- **🚂On Track with Apache Kafka: Building a Streaming Platform solution with Rail Data**
  - https://rmoff.dev/oredev19-on-track-with-kafka



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#EOF

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